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- 1 -

TITLE

APPARATUS AND METHOD FOR COLLECTING USED OFFICE SUPPLIES

FIELD OF THE INVENTION

[0001] The present invention relates to an apparatus and a method for collecting used office supplies and a recording medium used therefor, and for example to collection of used office supplies such as cartridges.

BACKGROUND OF THE INVENTION

[0002] Some types of electrophotographic printers or facsimiles are fitted with cartridges containing toner which are replaced in whole when the toner has run out. Such types have the advantages that the toner is easily added and that consumable components incorporated in the cartridge, such as a photosensitive drum, developing device, cleaning member and the like, are replaced at the same time as the replacement of the cartridge, which facilitates maintenance of the equipment. Providing the cartridge with part of the components of the equipment can also reduce the production cost of the equipment.

[0003] Fig. 1 is a schematic diagram showing a flow among a manufacturer, dealer, user and collecting center of the cartridge.

[0004] The cartridge is usually sold by a manufacturer 1 of the equipment to which the cartridge is fitted, through a sales channel to a user 3. That is, the user 3 purchases the cartridge from a dealer 2 and uses it.

[0005] A used cartridge is brought to the dealer 2 by the user 3 and then packed in a collecting container by the dealer 2 to be sent to a collecting center 4 managed by the manufacturer 1 or the like. Alternatively, the user 3 sometimes directly packs the used cartridge in the collecting container and sends it to the collecting center 4.

[0006] Fig. 2 is a flowchart for explaining collecting work in the collecting center 4.

[0007] For collecting, the dealer 2 or user 3 (hereinafter referred to as the "customer") sends a request for collecting to the collecting center 4 or the like using a communication device such as a facsimile, which is received by the collecting center 4 (S1). The collecting center 4, having received the request for collecting, generates a collecting slip for the customer (S2) to send the collecting container (box), with the slip attached, to the customer (S3). Then, the used cartridges sent by the customer are classified by a visual check or the like by an operator (S4) to be input via a keyboard or the like, thereby obtaining collecting data relating to that customer (S5).

[0008] The customer is informed of a collecting rate calculated for the purpose of promoting the collection of used cartridges. The collecting rate is basic for setting incentives for the customer. That is, the collecting center 4 collates collecting data of the customer with a record of orders accepted (sales) to calculate the collecting rate (S6) and to set an incentive, which is reported to the customer (S8). The report to the customer has been conventionally made by mail.

[0009] Collecting the used cartridges with such an incentive is extremely effective for improving the collecting rate.

[0010] As described above, the cartridge is not only used as a container containing the toner but also sometimes serves as a component with consumable components incorporated such as the photosensitive drum, developing device, and cleaning member, or merely has the function of containing the toner. Thus,

with regard to the cartridge only, there are various kinds of cartridges, so that setting the incentive for all types of cartridges by the collecting rate of the customer only, cannot be regarded as a useful method. For this reason, as shown in Fig. 2, the collecting rate is calculated for respective kinds of collected cartridges to set the incentive for respective kinds of cartridge.

[0011] Moreover, a target for collecting is not limited to cartridges but includes toner containers and photosensitive drums for a copier, an ink container, cartridge and print head for a inkjet printer, other service parts, paper and OHP sheets and the like, and further includes bodies of office equipment such as a printer body, copier body, and scanner body. In the following description, the target goods for collecting are sometimes referred to collectively as "used office supplies".

[0012] In this way, counting of the data in the collecting center 4 as described above and setting the incentive are extremely complex and troublesome, and it is considered to be difficult to count the data precisely, because of classification errors or input errors by the operator.

[0013] On the customer's side, since the counting of the data described above takes time, it is an inconvenience that the current condition of collecting cooperation cannot be seen or otherwise determined immediately, and there is also the disadvantage that it takes time to obtain the results of the collecting cooperation.

SUMMARY OF THE INVENTION

[0014] The present invention is made in order to solve the above problems individually or collectively and has as its object to count data of collecting for used office supplies easily and precisely.

[0015] Another object of the present invention is to enable a user immediately to grasp current collecting condition so that the result of a program of course of collecting cooperation is immediately reflected.

[0016] Still another object of the present invention is to permit grasping in advance the used office supplies to be collected.

[0017] A further object of the present invention is to enable a collecting program flexibly to provide an incentive to promote collection.

[0018] A still further object of the present invention is to permit a quicker response to a request for collecting used office supplies from a client to a collecting center.

[0019] To attain these objects, disclosed in a preferred embodiment of the present invention is a server, capable of communication with a plurality of client computers through a computer network, for discriminating log-in information received from each client computer, and transmitting data of an order screen used by a user for the purpose of ordering a new consumable, to a logged-in client computer. The server comprises a first input section, arranged to input order data inputted by a user who uses the order screen displayed on a monitor of the logged-in client computer, and a second input section, arranged to input collecting data of a used consumable returned from the user. A database stores the order data and the collecting data in relation with the log-in information, and a calculator calculates an incentive based on a plurality of the order data and a plurality of the collecting data stored in the database in a unit of the log-in information. Also provided are a generator, arranged to generate price data of the new consumable in accordance with the incentive in the unit of the log-in information, and a provider, which provides the logged-in client computer with the price data corresponding to the log-in information of that client computer to display a price of the new consumable on the order screen.

[0020] Other aspects of the invention include a method in which are performed the operations of the mentioned server, and a program product for executing such method using a computer.

[0021] Other features and advantages of the present invention will be apparent from the following description taken in conjunction with the accompanying drawings, in which like reference characters designate the same or similar parts throughout the figures thereof.

BRIEF DESCRIPTION OF THE DRAWINGS

- [0022]** Fig. 1 is a diagram showing a flow of a toner cartridge;
- [0023]** Fig. 2 is a flowchart for explaining collecting work in a collecting center;
- [0024]** Fig. 3 is a schematic diagram showing a sequence of collecting of used office supplies in a collecting system according to one embodiment of the invention;
- [0025]** Fig. 4 is a block diagram showing an arrangement and connection of a network of the collecting center and a user;
- [0026]** Fig. 5 shows a login screen of a sale/collecting system;
- [0027]** Fig. 6 shows a selection screen of processes;
- [0028]** Fig. 7 shows a purchase screen of office supplies;
- [0029]** Fig. 8 shows a selection screen of collecting manners;
- [0030]** Fig. 9 shows a screen displayed when lump-sum collecting is desired;
- [0031]** Fig. 10 shows a screen displayed when individual collecting is desired;
- [0032]** Fig. 11 shows a collecting slip;
- [0033]** Fig. 12 shows a confirmation screen;
- [0034]** Fig. 13 shows a detail screen;
- [0035]** Figs. 14 to 16 are flowcharts for explaining processing in the sale/collecting system;
- [0036]** Fig. 17 is a flowchart showing processing in a collecting system after arrival of the used office supplies;
- [0037]** Figs. 18A and 18B are flowcharts showing exceptional processing;
- [0038]** Fig. 19 shows a login screen of the sale/collecting system during a promotion term for the purpose of promotion of collecting specific used office supplies;
- [0039]** Fig. 20 shows a table of a relationship between a collecting rate and an incentive;
- [0040]** Fig. 21 shows a table of relationship between quantity of orders accepted and a discount rate;
- [0041]** Fig. 22 shows a table of relationship between the collecting rate and incentive during the promotion term;

[0042] Fig. 23 is a diagram for explaining a prediction sequence of the collecting and shipping;

[0043] Fig. 24 shows a cartridge used in a printer;

[0044] Fig. 25 shows data stored in a memory of the cartridge;

[0045] Fig. 26 is a schematic view showing a configuration of a laser beam printer; and

[0046] Fig. 27 is a schematic view showing a configuration of an inkjet printer.

DETAILED DESCRIPTION OF THE PREFERRED EMBODIMENTS

[0047] A collecting system of used office supplies according to the present invention will be described below in detail with reference to the drawings. In describing these embodiments, a cartridge used in equipment such as an electrophotographic printer, copier and facsimile device is taken as the basis for explanation as an example of used office supplies, but the present invention can be applied to other used office supplies. These may include, for example, a toner container and photosensitive drum for the copier, other service parts, paper, OHP sheets, an ink container, a cartridge and print head for an inkjet printer. For many of them, empty containers are desired to be collected, for example, the toner container and a package box of the toner for the copier are desired to be collected.

[Summary of a Collecting System]

[0048] Fig. 3 is a view of a sequence showing an outline of collecting of the used office supplies in the collecting system of this embodiment.

[0049] For collecting, a client 6 in Fig. 3 accesses a collecting system 5 in the Fig. 3 via a page of a Web site presented by the collecting center 4 in Fig. 1 (S11), and when certified as a registered user by the collecting system 5 (S12), requests collecting of the used office supplies (S13). This request includes information on kinds and number (quantity) of the used office supplies which are desired to be collected, and the client may also tell an expected date of collecting or area for collecting to the collecting center 4.

[0050] The collecting system 5 in Fig. 3 receives the request for collecting via the Internet or the like and stores the data of the kinds and number (quantity) of

the used office supplies to be collected associated with the user in the memory (S14) and transmits a collecting code corresponding to the data to the client 6 (S15). The client 6 having received the collecting code generates a collecting slip including at least the collecting code received (S16) and dispatches the used office supplies, with the collecting slip attached, to the collecting center 4 (S17).

[0051] The collecting center 4 reads out the collecting code recorded on the collecting slip attached to the used office supplies dispatched (S18), confirms that the used office supplies are collected in compliance with the collecting data corresponding to the collecting code (S19) and calculates the collecting rate and sets the incentive for respective users and used office supplies (S20). If necessary, the client 6 is informed of the collecting rate and incentive (S21).

[0052] The collecting system 5 may also generate the collecting slip including at least the collecting code after receiving the collecting request and send a collecting container such as a collecting box, with the collecting slip attached, to the client 6. The collecting system also works out by a manner that the client having received the collecting container packs the used office supplies for which the collecting is requested in the collecting container to be dispatched to the collecting center 4.

[0053] In short, it is sufficient if the collecting code stored in the memory such as a barcode or alphanumeric character string for accessing the information (collecting data) on the kind and number (quantity) of the used office supplies to be collected and on the user is readably attached or recorded on the used office supplies to be collected or their packages.

[0054] Comparing the kind and number (quantity) of the supplies to be reused which are shown by the collecting data read out from the memory with the kind and number (quantity) of the supplies actually collected, the collecting data is corrected if there is a difference in the kind and number (quantity) or if there are the used office supplies impossible to be reused such as the one made by other makers or the like. Then, the collecting rate is calculated from the collecting data of the user stored in the memory (having been confirmed or corrected) and the record of the orders accepted (sale), and the incentive is set by referring to (or calculating) the table based on the calculated collecting rate.

[0055] In the series of collecting process in the above collecting center 4, in a work associated with the confirmation of the collecting goods in the step S19, comparison of the data read out from the collecting code with the goods actually collected may be carried out by a man, or of course may be automatically carried out using a device which utilizes image recognition to automatically read out the barcode or the like which carries the data of the kinds or the like concerning the used office supplies attached in advance to the used office supplies.

[0056] [Arrangement of Collecting System]

[0057] Fig. 4 is a block diagram showing an arrangement and connection of a network of the collecting center 4 and user 6, and Figs. 14 to 16 are flowcharts for explaining a process of a sale/collecting system. In this embodiment, description is made on the basis of a system including the sale and collecting of the office supplies together, but it is extremely easy to utilize the sale system and/or collecting system 5 independent of the sale/collecting system.

[0058] A PC 24, Web server 13, DB server 14, AP server 15, PC 16 and PC 18, respectively, shown in Fig. 4, comprise at least arrangements which a typical computer comprises such as a Central Processing Unit (CPU), memory, communication part and the like, and each step mentioned below of the flowcharts shown in Figs. 14 to 16 is achieved by the fact that the CPU provided in each device reads out and carries out a program code stored in the memory. In Fig. 4, the server devices are functionally classified into plural devices, and in the description of each step of the flowcharts shown in Figs. 14 to 16, any of the devices carries out the process, but of course, physically both one device and plural devices can achieve the process of each step of the flowcharts shown in Figs. 14 to 16 if the devices logically have each function of the Web server 13, DB server 14, AP server 15, PC 16 and PC 18.

Login

[0059] A left side in Fig. 4 shows a network system of the collecting center 4. The user 6 uses the personal computer (PC) 24 to access the Web server 13 which is a window of the sale/collecting system via gate ways 23 and 12 connected to a wide area communication network 11 such as the Internet and logs in (S31 in Fig. 14). The Web server 13 provides the PC 24 operated by the user 6 with a login

screen shown in Fig. 5. The more proper expression is “provides the PC 24 with Hyper Text Markup Language (HTML) data for displaying a screen”, but for easier description, it is described as “provides with a screen”.

[0060] The Web server 13 requests a “Client Number (User Code)” and “Password” of the user 6 and passes the received data to the application (AP) server 15 in which software is activated which plays a central role of the collecting system 5. The AP server 15 compares the input user code and password with the user data obtained by the database (DB) server 14 to certify that the user is registered (S32 in Fig. 14). When the user is registered, a selection screen of processes shown in Fig. 6 is provided to PC 24 via the Web server 13 (S34 in Fig. 14).

[0061] When the user 6 is unregistered, user registration can be effected by pushing a [Register] button of the screen in Fig. 5 (S33 in Fig. 14). In the user registration screen which description is omitted, the user 6 inputs necessary matters such as a name (corporate name), name of a person in charge when the user is a corporation, postal code, address, telephone number, facsimile number, e-mail address, name of the equipment used and the like. Such information is stored in the DB server 14 and the above mentioned user code and password are issued. The issue of the password to the user is carried out by e-mail, mail and the like.

Purchase of Office Supplies

[0062] When “Purchase Office Supplies” is clicked in the screen of Fig. 6 (S36 in Fig. 14), the AP server 15 provides the PC 24 with a purchase screen of the office supplies shown in Fig. 7 via the Web server 13 (S37 in Fig. 14). The user 6 selects model numbers of the office supplies which the user desires to purchase and inputs the quantity. Fig. 7 shows an example when the model numbers of the cartridges “CRG-1” and “CRG-2” are input. The AP server 15 obtains from the DB server 14, a unit price corresponding to the input model number and a discount rate to a total amount to transmit them to the PC 24 so that the unit price and the discount rate are indicated in real time on the purchase screen (S38 in Fig. 14). The unit price corresponding to the input model number and the

discount rate corresponding to the model number may be obtained from the DB server 14. The discount rate includes the above described incentive.

[0063] The user 6 lists goods desired to purchase, confirms their amount to be charged or the like, corrects the list if there is any change, and pushes a [Transmit] button shown in Fig. 7 (S39 in Fig. 14), then the order for the office supplies is completed. After that, the AP server 15 carries out processes such as confirmation of a content of the order, setting and confirmation of a due date (S40 in Fig. 14), and a process of accepting the order (S41 in Fig. 14), which detailed description is omitted since it has no direct relation to this embodiment.

[0064] Then, the process returns to the step S34 where the selection screen of the process shown in Fig. 6 is again provided to the PC 24 via the Web server 13. The user 6 pushes a [logout] button to log off when the desired process is finished (S35 in Fig. 14).

Request for Collecting

[0065] When “Request for Collecting of Used Business Supplies” is clicked in the screen of Fig. 6 (S36 in Fig. 14), the AP server 15 provides the PC 24 with a selection screen of collecting manners shown in Fig. 8 via the Web server 13 (S51 in Fig. 15). The user 6 can select the collecting manner as desired from a lump-sum collecting or an individual collecting and clicks either of them (S52 in Fig. 15). The AP server 15 has a recognizing function for recognizing that the user selects the lump-sum collecting or individual collecting and recognizes that the user selects the lump-sum collecting or individual collecting to provide the user with a screen corresponding to each of them via the Web server 13.

[0066] Fig. 9 shows a screen which is provided in a step S53 when the user 6 desires the lump-sum collecting. The user 6 selects the model number and quantity of the used office supplies desired for the lump-sum collecting and then pushes the [Transmit] button (S54). In Fig. 9, the AP server 15 in Fig. 4 stores “CRG-1, n” and “CRG-3, m” as the above described collecting data in the DB server 14 in Fig. 4 associated with the user 6 (n and m mean the quantity of the used office supplies to be contained in the collecting container) (S55).

[0067] Further, the AP server 15 in Fig. 4 arranges for sending the collecting container corresponding to the selected supplies to the user 6 (S56). More

specifically, an invoice and the above described collecting slip are printed by a printer 19 in Fig. 4, and in accordance with the invoice, the collecting container with the collecting slip attached is dispatched to the user 6.

[0068] The client 6 stores the used office supplies in the collecting container and requests collecting of the collecting center 4 when the collecting container is filled. The above description has been made on the assumption that the client 6 desires the lump-sum collecting. However, when the information of the client such as a dealer which deals with large numbers of office supplies is recognized from the DB at the time of login of the request screen, the screen for the lump-sum collecting in Fig. 9 can be directly displayed after clicking "Request for Collecting of Used Business Supplies" in Fig. 6, thereby permitting reduction of a burden of the client.

[0069] Fig. 10 shows a screen which is provided (displayed) in a step S57 when the client 6 desires the individual collecting. The client 6 selects the model number of the used office supplies desired for the individual collecting and inputs the quantity and desired collecting date and then pushes the [Transmit] button (S58). In Fig. 10, the AP server 15 in Fig. 4 stores "CRG-1, 1", "CRG-1, 1", "CRG-1, 1" and "CRG-3, 1" as the collecting data in the DB server 14 in Fig. 4 associated with the user 6 (S59). Further, the AP server 15 detects a collectable date close to the desired collecting date based on the data of the DB server 14. If the desired collecting date does not coincide with the collectable date, there is a procedure that the AP server 15 lists the collectable date close to the desired collecting date to be selected by the user 6, which detailed description is omitted.

[0070] When the expected collecting date is decided, the AP server 15 in Fig. 4 transmits a collecting slip data to the PC 24 for having the user 6 print the above described collecting slip (S60). If formed by the HTML data which is displayable by a browser or Graphics Interchange Format (GIF) image, the collecting slip data can be printed by the browser activated in the PC 24 by a printer 22 or 25. However, when printing with high resolution is required, such as in the case where the collecting data is indicated as a barcode, it is desirable to send the collecting slip data to the PC 24 as Portable Document Format (PDF) to be printed. The above description is made on the assumption that the user has the

printer, but in a case where the user has no printer, it is possible to have the user freely select obtaining manners of the collecting slip by providing a selection screen of transmitting the collecting slip data to the user of transmitting via the Internet or mailing the collecting slip generated by the collecting center. The AP server 15 recognizes the selection by the user and has the user obtain the collecting slip by either manner depending upon the recognition.

[0071] Then, the process returns to step S34 where the selection screen of the process shown in Fig. 6 is again provided to the PC 24 via the Web server 13. The client 6 pushes the [logout] button to log off when the desired process is finished (S35).

[0072] Fig. 11 shows the collecting slip printed by the collecting center or user. In Fig. 10, the number of the cartridges CRG-1 is three and CRG-3, one, so that three collecting slips for CRG-1 and one collecting slip for CRG-3 are printed. When the collecting slip is generated by the user, it is effective in printing the collecting slip to place a recording paper of A4 size coated with adhesive on its back side in a package box for the used office supplies. The size of the recording paper is not limited to A4, but recording paper of any size such as B4 or A5 may be used which can be output by the printer.

[0073] The user 6 cuts the printed collecting slip and correctly attaches the collecting slip to the used office supply to be collected or to its package box. Then, the preparation for the individual collecting is completed.

[0074] The above description is made based on an example that the collecting center 4 prepares collecting service. This makes it possible to collect the used office supplies effectively utilizing the service for delivering the office supplies. The transporting manner of the used office supplies to the collecting center 4 is of course not limited to this.

Confirmation of Incentive or the Like

[0075] When "Confirm Collecting Rate and Incentive" is clicked in the screen of Fig. 6 (S36), the AP server 15 in Fig. 4 provides the PC 24 with a confirmation screen shown in Fig. 12 via the Web server 13 (S71). When desiring to see the detailed collecting rate and incentive, the user 6 pushes the [Detail] button (S72). When the [Detail] button is pushed, the AP server 15 provides the PC 24 with a

detail screen shown in Fig. 13 via the Web server 13 (S73). When a [Return] button is pushed, the process returns to the step S34 where the selection screen of the process shown in Fig. 6 is again provided to the PC 24 via the Web server 13. The client 6 pushes the [logout] button to log off when the desired process is finished (S35).

[0076] Indicated in the confirmation screen shown in Fig. 12, are an average collecting rate and incentive, and indicated in the detail screen shown in Fig. 13 is a total average value of the collecting rate and incentive for respective office supplies from the user which orders have been often accepted so far and data with respect to each office supply.

Process after Collecting

[0077] Fig. 17 is a flowchart showing a process of the collecting system 5 shown in Fig. 3 after arrival of the used office supplies. Here, the process of each step shown in Fig. 17 is realized by the fact that the CPU provided in the above described server device carries out a process based on a program code stored in a non-volatile memory of the server device placed in the collecting center 5. For the server device, the Web server 13, DB server 14, AP server 15 and PC 16 shown in Fig. 4 can be applied, or a server device logically having each function of the Web server 13, DB server 14, AP server 15 and PC 16 can be applied.

[0078] When the used office supply reaches the collecting center, the collecting code recorded on the collecting slip is read out (S81) to be input to the AP server 15. If the collecting code is the barcode, a reader 17 connected to the PC 16 shown in Fig. 4 reads out the barcode, which data is transmitted to the AP server 15.

[0079] The AP server 15 reads out the collecting data corresponding to the input collecting code from the DB server 14 to be provided to the PC 16 or 18. Displayed on the screen of the PC 16 or 18 is the information represented by the collecting data such as the name of the user, request date, expected collecting date, area and kind and quantity of the collecting goods so that it can be easily confirmed that the collecting data coincides with the collecting goods (S82). The confirmation of the content of the collecting goods may be carried out by a person, or may be carried out by using a device which utilizes image recognition

automatically to read out the barcode or the like attached to the used office supply on which the data concerning the used office supply is recorded. If the collecting data does not coincide with the collecting goods, the collecting data is corrected (S83).

[0080] Next, the AP server 15 in Fig. 4 calculates the collecting rate for respective kinds of the collecting goods (S84). Namely, accumulated collecting data of the user is read out from the DB server 14 and the accumulated collecting data is updated by the collecting data at this time. Further, the data of the orders accepted of the user is read out from the DB server 14 to calculate the collecting rate for respective kinds of the used office supply from the record of the quantity of shipping and the accumulated collecting data. Then, it is confirmed that there is a kind of used office supply having the collecting rate of more than 100% (S85), and if all the rates are not more than 100%, they are stored in the DB server 14 as the collecting rates for respective kinds of the user (S86).

[0081] Then, The AP server 15 averages all the collecting rates for respective kinds of the user and calculates an average collecting rate of the user to be stored in the DB server 14 (S87). If the average collecting rate is more than a predetermined value α (S88), the incentive is set using an incentive conversion table mentioned below (S89).

[0082] Next, the AP server 15 calculates the average collecting rate of all the users (S90) and if the average collecting rate is more than a predetermined value β (S91), finishes the process. If the average collecting rate is less than the predetermined value β , the AP server 15 gives a warning (S92). The below mentioned treatment is carried out in compliance with the warning (S93).

[0083] On the other hand, when there is the kind having the collecting rate of more than 100% in the step S85, the process is moved to the exception process shown in Figs. 18A and 18B. Here, likewise Fig. 17A, the process of each step shown in Figs. 18A and 18B is realized by the fact that the CPU provided in the above described server device carries out the process based on the program code stored in the non-volatile memory of the server device placed in the collecting center 5. For the server device, the Web server 13, DB server 14, AP server 15 and PC 16 shown in Fig. 4 can be applied, or the sever device logically having

each function of the Web server 13, DB server 14, AP server 15 and PC 16 can be applied.

[0084] First, verification is conducted that there is any error in the collecting data stored in the DB server 14 (S94) and if there is an error in the data (S95), the collecting data stored in DB server 14 and/or data of orders accepted are corrected (S100), and the process returns to the step S84.

[0085] When there is no error in the collecting data stored in the DB server 14, detailed reason thereof is checked (S96). Namely, the e-mail with a questionnaire or the like attached is sent to the user to obtain an answer. The following reasons are considered as reasons for a collecting rate of more than 100%. (Reason (3) is stated on the assumption that a business place or post of a certain company is registered as the user while the used office supplies are taken off from other business place or post.)

[0086] Reasons for a collecting rate of more than 100%:

[0087] (1) Used office supplies that were already owned by the user before registration are collected.

[0088] (2) Used office supplies sold by another route are collected.

[0089] (3) Used office supplies taken off from other places are collected.

[0090] If there is an answer from the user (S97), proper treatment is effected in response to the contents of the answer. For example, when the answer is reason (1), there is no specific problem, so that the process returns to step S86 via steps S97, S98 and S99. When the answer is reason (2) or (3), consulting with the user, the data is corrected (S100), and the process returns to step S84.

[0091] If there is no answer from the user (S97), the warning is given (S101) and a manager or the like of the collecting system 5 checks the cause of obtaining no answer or the like (S102).

[0092] When the average collecting rate of the user is less than the predetermined value a in the step S88, the process is moved to the exception process shown in Fig. 18A. First, verification is conducted that there is any error in the collecting data stored in the DB server 14 (S103) and if there is an error in the data (S104), the collecting data stored in the DB server 14 and/or data of orders accepted are corrected (S107), and the process returns to the step S84.

[0093] When there is no error in the collecting data stored in the DB server 14, detailed reason thereof is checked (S105). Namely, the e-mail with a questionnaire or the like attached is sent to the user to obtain an answer.

[0094] Reasons for a collecting rate less than a:

[0095] (4) Used office supplies are being disposed of.

[0096] (5) Another collecting route is used.

[0097] If there is an answer from the user (S106), in response to the content of the answer, collecting cooperation is requested or the reason for using another collecting route is checked separately to obtain information for improving the collecting system 5 and its service.

[0098] Then, the process returns from step S106 to step S89 without correcting the data.

[0099] If there is no answer from the user (S106), a warning is given (S108) and the manager or the like of the collecting system 5 checks the cause of obtaining no answer or the like (S109).

[Countermeasure to Low Collecting Rate]

[0100] When it is detected that the average collecting rate is less than the predetermined value β of all the users in step S91, it means that collecting by the collecting system 5 is not functioning sufficiently. In this case, causes thereof are first checked, and correction is effected in accordance with the result. For example, greater collecting cooperation is requested or a promotion for promoting collecting (increasing the ratio of the incentive or the like when cooperating in collecting for a predetermined term) is effected to improve the average collecting rate.

[0101] The AP server 15 monitors not only the average collecting rate of all the users but also the average collecting rate for respective kinds of the used office supplies of all the users. When the average collecting rate for respective kinds becomes less than a predetermined value γ , a warning is given likewise. In this case, with respect to the target used office supplies, greater collecting cooperation is requested or the promotion for promoting collecting (increasing the ratio of the incentive when cooperating in collecting the target used office supplies for the predetermined term) is effected to improve the average collecting rate.

[0102] The need for improving the collecting rate of the specific kind arises not only in a case where the collecting rate is lowered but also where it is predicted that demand for the used office supplies of the specific kind is increased. In this case, also, greater collecting cooperation is requested or the promotion for promoting the collecting (increasing the ratio of the incentive when cooperating in collecting the target used office supplies for the predetermined term) is effected to improve the average collecting rate.

[0103] Fig. 19 is a view showing a login screen of a sale/collecting system during the promotion term for promoting collecting of the specific used office supply which is provided by the Web server 13 to a terminal device used by the user. Substantially the same login screen may be prepared in the case of improving the entire collecting rate. It is, of course, effective to indicate a banner for promotion on not only the login screen but also other screens.

[0104] Moreover, more flexible incentive can be provided by varying the above described promotion manner of the incentive for respective areas or countries.

[Setting of Incentive]

[0105] Fig. 20 shows a table of relationship of the collecting rate, kind of the office supply and incentive, and Fig. 21 shows a table of relationship between the quantity of orders accepted, kind of the office supply and discount rate. These tables are stored in the DB server 14.

[0106] The AP server 15 can refer to the table shown in Fig. 20 and obtain the incentive corresponding to the collecting rate for respective kinds of the office supplies. Then, the AP server 15 generates the data of the incentive value to be indicated on the confirmation screen shown in Figs. 12 and 13.

[0107] The AP server 15 can also refer to the table shown in Figs. 20 and 21 and obtain the collecting rate by office supplies and discount rate corresponding to the quantity of the orders accepted to thereby count the data and calculate the discount rate to the user. Then, the data of the value of the discount rate is generated which is to be indicated on the purchase screen shown in Fig. 7.

[0108] The above description was made on the basis of an example in which the incentive and discount rate are decided in compliance with the collecting rate and transaction scale (charge, quantity) per a predetermined term. However, the

incentive and discount rate may be decided by not only the collecting rate and quantity of the orders accepted but also the quantity of accumulated orders accepted, kind of equipment which the office supply accommodates, limited collecting term, collecting area and the like. In short, it is sufficient that the incentive and discount rate are decided such as to construct a system where the used office supply is effectively collected. For example, during the above described promotion term which improves the collecting rate, a table with a large incentive set as shown in Fig. 22 is used instead of the table shown in Fig. 20. Also, the description is made based on an example of the discount as the incentive to the user, but the incentive to the user may be in the form of providing presentation such that points are added depending upon the quantity or charge of the orders accepted and that one supply is provided to the user for free when certain amounts of points are accumulated.

[Analysis of Shipping and Collecting Interval]

[0109] In the DB server 14 of the sale/collecting system described above, the data of the orders accepted and collecting data are accumulated for respective users and kinds of the office supplies. These data permit predicting the shipping and collecting interval for respective kinds of the office supplies.

[0110] Fig. 23 is a view explaining a prediction sequence of the collecting and shipping.

[0111] By the processes from steps S81 to S83 shown in Fig. 17, the collecting date 30, the collecting quantity 31 and collecting area 32 for respective kinds can be obtained. These are stored in the DB server 14 as the record 34 of collecting date, record 35 of collecting quantity and record 33 of collecting area separately from the above described collecting data.

[0112] Accordingly, by analyzing the record 34 of collecting date, the collecting interval 42 for respective kinds can be obtained such as "CRG-2; every three days". In addition, by incorporating the collecting interval 42 for respective kinds with the record 35 of collecting quantity, a normalized collecting interval 43 for respective kinds can be obtained such as "CRG-2; collected every 1.2 days per one".

[0113] From the record 34 of collecting date and record 35 of collecting quantity, monthly variation and distribution 44 of collecting quantity for respective kinds can be obtained. The normalized collecting interval 43, monthly variation and distribution 44 of collecting quantity and record 33 of collecting area for respective kinds as so obtained can be reflected on a managing plan 48 of the collecting center 4.

[0114] The same applies to shipping. By the processes from steps S81 to S83 shown in Fig. 17, a shipping date 39, shipping quantity 40 and shipping area 41 for respective kinds can be obtained. These are stored in the DB server 14 as the record 37 of shipping date, record 36 of shipping quantity and record 38 of shipping area separately from the above described shipping data.

[0115] Accordingly, by analyzing the record 37 of shipping date, the shipping interval 47 for respective kinds can be obtained such as "CRG-3; every seven days". In addition, by incorporating the shipping interval 47 for respective kinds with the record 36 of shipping quantity, a trend 46 of the shipping interval for respective kinds can be obtained such as "CRG-2; ship one per 0.7 days".

[0116] From the record 37 of shipping date and record 36 of shipping quantity, monthly variation and distribution 45 of shipping quantities by respective kinds can be obtained. The trend 46 of the shipping interval, monthly variation and distribution 45 of shipping quantity and record 38 of shipping area for respective kinds as so obtained can be reflected on a production plan 50 of a manufacturer of the office supply.

[0117] Moreover, the data, record 33 of collecting area and record 38 of shipping area obtained by the above analysis are utilized in a travelling plan 49 of the service for delivering the office supply to the client and collecting the used office supply from the client to achieve an efficient travel.

[0118] In this way, according to the collecting system of the office supply of this embodiment, the collecting slip attached to the used office supply to be collected and the collecting code recorded on the collecting slip attached to the collecting container are read out to thereby permit accessing the corresponding collecting data.

[0119] Accordingly, counting of the data in the collecting center 4 collecting the used office supplies of various kinds, namely calculation of the collecting rate for respective kinds and calculation of average collecting rate can be facilitated and the incentive is immediately obtained from the obtained collecting rate by referring to the table to thereby permit remarkable improvement of working efficiency in the collecting center 4.

[0120] If the working efficiency is improved in the collecting center 4, of course, an improvement of the service to the user also becomes possible such as increasing of the incentive.

[0121] On the other hand, the user can count the data described above in shorter time and can immediately grasp the condition of the latest collecting cooperation so that the result of the collecting cooperation comes to be immediately reflected on the incentive. Consequently, more cooperation of the user can be obtained and the improvement of the collecting rate is expected.

[0122] Further, reduction of the collecting rate can be immediately detected to be treated so that the reduction of the collecting rate can be prevented. Especially, not only the reduction of the collecting rate of all the users and all the supplies but also the reduction of the collecting rate for respective users and office supplies can be detected, which permits carrying out the fine treatment as described above.

[Example of Supplies]

[0123] Fig. 24 is a view showing a cartridge 810 used in a printer 100.

[0124] A semiconductor memory 810a is incorporated in the cartridge 810. When the cartridge 810 is fitted to the printer 100, the semiconductor memory 810a is electrically connected to a controller of the printer 100 to be readable and writable.

[0125] Though not shown in Fig. 24, an indicating panel may be provided which indicates a type ID showing a type of the cartridge 810, serial number, total number of prints and remaining amount of toner and the like. Of course, the type ID and serial number are decided at the time of production and not changed so that they may be recorded on a casing of the cartridge 810 by printing or the like. On the other hand, the total number of prints and the remaining amount of toner

vary depending upon use of the cartridge 810 so that the indicating panel is required for indicating them.

[0126] For the indicating panel, a liquid crystal indicating panel of compact size or the like can be used which includes its control circuit and a backup power supply. If utilizing an EEPROM or a flash memory as the semiconductor memory 810a and utilizing an indicating device such as an indicating panel using a ferroelectric liquid crystal which can maintain indicating when the power supply is cut off, the power may be externally (for example, from the printer 100) supplied only when the data of the semiconductor memory 810a is rewritten and even the backup power supply is unnecessary.

[0127] In this way, having the cartridge 810 per se hold and indicate identification information of the cartridge 810 such as the type ID and serial number permits carrying out identification of the cartridge 810 easily and precisely from its appearance or by reading out the data of the semiconductor memory 810a.

[0128] Moreover, having the cartridge 810 per se hold and indicate the information on the condition of use of the cartridge 810 such as the remaining amount of toner and number of prints allows determination whether that the cartridge is used or not be made easily and precisely from its appearance or by reading out the data in the semiconductor memory 810a.

[0129] Fig. 25 shows the data stored in the memory 810a.

[0130] Stored in the memory 810a are data 901 showing the total number of prints printed using the cartridge 810 and the total number of jams, data 902 and 903 showing the number of prints and the number of jams for respective sizes of paper. In Fig. 10, the number of prints or number of paper is called "count". These data are counted up each time one page is printed by the printer 100 fitted with the cartridge 810.

[0131] Also stored in the memory 810a is the data 904 showing the remaining amount of toner. The data 904 may be a value showing the remaining amount of toner per se or may be a flag showing an output of a sensor for detecting reduction of the toner to a predetermined amount, so-called, a toner-low output.

[0132] Further stored in the memory 810a is data 905 showing start and end dates of use and data 906 showing the term of use. Usually provided in the printer 100 is a sensor for detecting opening and closing of a cover of a fitting portion of the cartridge. For example, when the opening and closing of the cover is detected, a controller in the printer 100 compares the serial number of the cartridge 810 stored in the non-volatile memory with the serial number read out from the cartridge 810 after detecting the cover, and if they do not coincide with each other, determines that the cartridge 810 is replaced. Then, the controller writes the data showing the date at that time as the start date of use in the memory 810a. In addition, at the time of power on or every 24 hours, data representing the date at that time is written in the memory 810a as the end date of use, as well as data representing the term of use is written in the memory 810a.

[0133] Moreover, stored in the memory 810a is data 907 written at the time of production or shipping of the cartridge 810 and showing the type ID and serial number which are the above described identification information. The data 907 may include data showing a service center where to make a contact at the time when the toner runs out.

[Detailed Example of Device Where the Supplies are Used]

[0134] Fig. 26 is a schematic view showing a configuration of a laser beam printer (LBP) fitted with the office supply of this embodiment.

[0135] In Fig. 26, an image scanner 2201 reads out an original image and carries out a digital image process of the original image. A printer 2202 forms an image corresponding to the original image read out by the image scanner 2201 on a recording paper to be output.

[0136] In the image scanner 2201, reference numeral 2220 denotes a pressing plate of the original; 2203, a stand glass (platen glass) of the original, and the original 2204 is placed with its recording surface downward in the Figure to be fixed by the pressing plate 2200 of the original. Light output from the fluorescent lamp 2205 is reflected by the original 2204, introduced by mirrors 2206, 2207 and 2208 to focus the image by a lens 2209 on a linear CCD image sensor (hereinafter called "CCD") 2210. The lens 2209 is provided with a cutting filter of infrared light. The CCD 2210 separates reflected light of the original 2204

into each color of red (R), green (G) and blue (B) to be read out and sends an analog image signal obtained to an image processing portion 2211. Here, a unit having the fluorescent lamp 2205 and mirror 2206 is mechanically moved in a sub scanning direction perpendicular to the CCD 2210 at speed V, and a unit having mirrors 2207 and 2208 at speed V/2, so that the entire original 2204 is read out.

[0137] The CCD 2210 is, for example, in the form of three lines (1210-1 to 1210-3) of light receiving pixel with approximately 7500 pixel of each color of RGB and can read out 297 mm transversely of the original of A3 size at the resolution of 600 dpi. In order to read out 297 mm transversely of the original of A3 size at the resolution of 400 dpi, one-dimensional image sensor with approximately 5000 pixel of each color of RGB is sufficient.

[0138] An image processing portion 2211 converts the analog image signal which is output from the CCD 2210 into a digital image signal and forms images of each color component of yellow (Y), magenta (M), cyan (C) and black (BK) corresponding to the colors of the toners for printing to be sent to a printer 2202. One of the color component images YMCBK is sent to the printer 2202 per one scanning of the original (one sub scanning) in the image scanner 2201.

Accordingly, by four times scanning of the original, the image signals of four color components are transmitted in turn to the printer 2202 to complete printing of one sheet. If there is enough memory in the image processing portion 2211, it is possible to store the image signal in the memory which is obtained by one scanning of the original and to dispense with the remaining three times scanning of the original.

[0139] The image signals of the color components of YMCBK transmitted in turn from the image processing portion 2211 in this manner are input to a laser driver 2212 in the printer 2202. The laser driver 2212 lights a laser diode 2213 in response to the input image signals. The laser beam output from the laser diode 2213 scans over a photosensitive drum 2217 through a polygon mirror 2214, f-q lens 2215 and mirror 2216 to form an electrostatic latent image on the photosensitive drum 2217.

[0140] The electrostatic latent image on the photosensitive drum formed by the laser beam is developed by developing devices 2219 to 2222 having the toners of yellow, magenta, cyan and black. Namely, four developing devices 2219 to 2222 abut in turn against the photosensitive drum 2217 to effect developing by the color toners.

[0141] The recording paper supplied from recording paper cassettes 2224 or 2225 is wound around the transferring drum 2223 by the action of static electricity and the toner image on the photosensitive drum 2217 is transferred thereto. In a recording process using four color toners, the toner of each color is transferred to the recording paper in a superposed manner by four times rotations of the transferring drum 2223. Then, the recording paper is separated from the transferring drum 2223 and the toner image is fixed thereon in a fixing unit 2226 to be discharged out of the apparatus.

[0142] In such an LBP, the photosensitive drum 2217, toner or cartridge accommodated in developing devices 2219 to 2222, recording papers accommodated in the recording paper cassettes 2224 and 2225 are consumable supplies.

[0143] Though not shown in the figure, the laser beam printer shown in Fig. 26 is provided, for example, with an interface with an external device such as a personal computer and can print the image based on the image data sent from the external device on the recording medium.

[0144] Fig. 27 is a schematic view showing a configuration of an inkjet printer (IJRA) fitted with the office supply of this embodiment.

[0145] In Fig. 27, a carriage HC, which works with a driving motor 5013 rotatably in a reverse direction and engages with a helical groove 5005 of a lead screw 5004 rotating via gears 5011 and 5009 for transmitting a driving force, has a pin (not shown) and is moved back and forth in directions of arrows a and b. The carriage HC is fitted with an ink jet cartridge IJC.

[0146] Reference numeral 5002 denotes a paper pressing plate, which presses the recording paper P against the platen 5000 across a moving direction of the carriage HC. Reference numerals 5007 and 5008 denote photo sensors which are detecting portions of a home position for confirming that there is a lever 5006 of

the carriage HC in an area where the sensor is placed in order to switch a rotational direction of the driving motor 5013. Reference numeral 5016 denotes a member for supporting a cap member 5022 which caps a front of a recording head IJH; 5015, a sucking portion for sucking the inside of the cap, which restores sucking of the recording head IJH through an opening in the cap 5023. [0147] Reference numeral 5017 denotes a cleaning blade; 5019, a member for enabling the blade to move back and forth, which are supported by a body support plate 5018. It is needless to say that the cleaning blade is not limited to this form but that the known cleaning blade can be applied to this embodiment. Reference numeral 5021 denotes a lever for starting sucking in sucking restoration, which moves with movement of a cam 5020 engaging with the carriage HC and by which a driving force from the driving motor 5013 is controlled at a known communication portion such as a clutch switching. [0148] The above described capping, cleaning and sucking restoration are adapted to carry out desired processes at their corresponding position by the action of the lead screw 5004 when the carriage HC comes to the area of the home position side, however, it is sufficient to have them carry out desired operation at known timings. [0149] In such an IJRA, the ink jet cartridge IJC and ink fitted therein are the consumable supplies.

<Other Embodiment>

[0150] The present invention can be applied to a system constituted by a plurality of devices (e.g., host computer, interface, reader, printer) or to an apparatus comprising a single device (e.g., copying machine, facsimile machine). [0151] Further, the object of the present invention can be also achieved by providing a storage medium storing program codes for performing the aforesaid processes to a system or an apparatus, reading the program codes with a computer (e.g., CPU, MPU) of the system or apparatus from the storage medium, then executing the program. [0152] In this case, the program codes read from the storage medium realize the functions according to the embodiment, and the storage medium storing the program codes constitutes the invention.

[0153] Further, the storage medium, such as a floppy disk, a hard disk, an optical disk, a magneto-optical disk, CD-ROM, CD-R, a magnetic tape, a non-volatile type memory card, and ROM can be used for providing the program codes.

[0154] Furthermore, besides aforesaid functions according to the above embodiment are realized by executing the program codes which are read by a computer, the present invention includes a case where an OS (operating system) or the like working on the computer performs a part or entire processes in accordance with designations of the program codes and realizes functions according to the above embodiment.

[0155] Furthermore, the present invention also includes a case where, after the program codes read from the storage medium are written in a function expansion card which is inserted into the computer or in a memory provided in a function expansion unit which is connected to the computer, CPU or the like contained in the function expansion card or unit performs a part or entire process in accordance with designations of the program codes and realizes functions of the above embodiment.

[0156] In a case where the present invention is applied to the aforesaid storage medium, the storage medium stores program codes corresponding to the flowcharts described in the embodiment. Briefly, the storage medium stores each module shown as an example of a memory map in the above.